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Design for a Mashup of Wordpress and Google Maps API

Case: Digital Service Innovation for Chinese Restaurants Management in Finland

LAHTI UNIVERSITY OF APPLIED SCIENCES
Degree programme in
Business Information Technology
Thesis
Spring 2013
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Lahti University of Applied Sciences
Degree Programme in Business Information Technology

Weng, Shiying: Design for A Mashup of Wordpress and Google Maps API
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Bachelor's Thesis in Business Information Technology, 51 pages, 1 appendix

Spring 2013

ABSTRACT

This thesis is based on a digital service innovation project for Chinese Restaurants in Finland using Wordpress and Google Maps API to build a dynamic website. The purpose of this thesis is to make a primary design for the project with a mashup of Wordpress and Google Maps API.

Mashup technology is widely used in website development during recent years. It enables an application or a web page to combine multiple data sources. Besides, as Wordpress is applied as a content management system in this project website, it is convenient for users to update and maintain contents and data on the website. Moreover, Google Maps play an increasingly important role in people's daily life. Google Maps API makes it free to embed Google Maps in a website with huge functionalities. The mashup of Wordpress and Google Maps API integrates multiple contents and location-based data to meet the users' needs.

User-centred web design is highly recommended for developing a functional and easy to use website which means users are involved and highly focused during the development processes. Therefore, it's vital to be aware of what users' requirements are concerning the website. Case studies are conducted based on two popular websites regarding restaurants management which are eat.fi and yelp.com. The studies aim to find out the strengths as well as the weaknesses of those two sites. In addition, some surveys and observations are taken to prove what users really need. Finally, data is collected and analysed to make the primary design for user interface of the project website.

Key words: Digital service innovation, mashup technology, Wordpress, content management system, Google Maps API, user-centred web design

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1 INTRODUCTION

More and more attention is paid to Digital service design and innovation nowadays. In Finland, there are more than 200 Chinese restaurants in operation of which approximately 70 Chinese restaurants are in the city of Helsinki. There isn't any website covering all the information on Chinese restaurants in Finland. How to make it more convenient for people in Finland to enjoy Chinese food and how to improve the Chinese restaurant management and advertising campaign become vital problems. It's time to think about digital service innovation for Chinese restaurants in Finland and therefore, the project is here.

When designing a website, user-centred web design is highly recommended and welcome. It's critical to foresee research and analyse what end users need or want at first stage and test usability and prototype during the development of the website. Some surveys are conducted to research how customers and end users are likely to visit the website before the project is carried out. Use case is selected as an analysis tool for user-centred web design.

Content management system is more and more popular among companies and organizations. It is easy and convenient for users to create, edit, publish, and maintain content on a website. Wordpress is chosen as a content management system in this project.

Moreover, Google Maps are always in people's daily life. It's easy for people to get a street view of a place that is not familiar. The idea of the project is to show all the Chinese restaurants in Finland with their information on a Google Map. Therefore, how to design the map with Wordpress is what was focused on in the project.

A mashup is a fashionable technology in web development during recent years. It is a web page or web application constructed by a combination of two or more data sources. Application programming interfaces (API) are widely used to achieve fast integration. Therefore, a mashup of Google Maps API and Wordpress is an excellent digital service innovation for the Chinese restaurants in Finland.

This thesis focuses on the construct design of mashuping Wordpress and Google Maps API for the project as a user-centred web design. Qualitative research methods are applied to the thesis.

2 RESEARCH APPROACH

2.1 Research problem and research question

The case project is to make a website in terms of digital service innovation for Chinese restaurants in Finland and based on user-centred web design in a small business. The aim of the project is to make people (both Chinese and Foreigners in Finland) go to their favourite Chinese restaurants after visiting the website and attract restaurants owners to consider the website as best advertising and publicity space. As a basic idea, Wordpress is chosen as a content management system to make it more efficient for the author and users (especially restaurants owners) to publish and maintain their blogs and contents on the website, and Google Maps as a basis to make it more convenient for people to see the locations of restaurants and find their best choices.

End users are key elements in the project. They can be Chinese restaurant owners, restaurant customers and people who are looking for a place to enjoy a meal. It's also necessary to analyse what functionalities there must be, should be, could be and won't be on the website on the basis of MoSCoW method. Therefore, it's important to know how users are likely to see the website.

Under this background, the research question is developed as how important is the mashup of Wordpress and Google Maps API for the case project and how to design this web page.

2.2 Qualitative research methods as a relevant

As the project is based on user-centred web design, end-users play an important role in this project. Case study research methods are applied to study the usability of the case websites and learn the strengths from them. Qualitative research methods are applied to research what end users need regarding this website via questionnaires and interviews.

Questionnaires are made for potential restaurant customers which are basically choice questions since it is more efficient and convenient for participants to fill

the questionnaires and for me to collect and analyse the data. The answers are collected via Internet. Google Form is used as a tool for gathering data of questionnaires through Internet by sending the questionnaires URL link. SPSS will be used as a tool for analysing data.

Observations are conducted on some sampled interviewees as well. Two case websites are studied; http://eat.fi/ and http://www.yelp.com/helsinki which are the existing websites for restaurants publicity. These interviewees are observed on how they act with the functionalities of the websites.

2.3 Research framework

The study begins with a literature review on user-centred web design. How to conduct the project based on user-centred web design is found out. A hypothesis that a mashup of Wordpress and Google Maps API is the key process of user-centred web design in this project is proposed then. In order to test the validity of the hypothesis, questionnaires and survey are conducted. Literature reviews on Wordpress and Google Maps API are necessary as well before designing the website.

A case study is conducted next on two case websites; http://eat.fi/ and http://www.yelp.com/helsinki. http://eat.fi/ is a quite popular website for searching restaurants in Finland. One can learn many good aspects from this website. These two websites are mentioned in questionnaires as well to see how users think about them. Observations are conducted based on actions with the case websites to understand how users think about them and what we can learn from the sites, how we can improve them as well.

After that, the most important section of the research starts which is data collection and analysis. Interviews are conducted based on questionnaires. The questionnaires are spreaded through email and social networking sites. Data is recorded and collected using Microsoft Excel, and analysed via SPSS.

Then the author constructs a design for the case project based on the result of data analysis. Both functional and non-functional requirements are made for this website. MoSCoW analysis is done as well.

Finally, conclusions are made based on the research. The result of the study is shown and some future opportunities are discussed.

2.4 Data collection methods

Data collection methods are basically literature reviews, case study and questionnaires. The questionnaires method is conducted via online survey and interview. Google Form is used as a tool for online survey and the URL links of Google Form questionnaires are sent to participants through email and social networking sites. Interviewees and questionnaires participants are sampled from people in Helsinki Metropolitan Area basically including students in Aalto University and restaurants customers. Questionnaires will be sent to some students in Lahti University of Applied Sciences as well by email.

Some observations are conducted as well for studying the cases. People were invited to be interviewed and their actions were observed to the case websites. Interviewees conduct a series of processes to achieve a goal set by me. They were observed carefully and their performances were recorded.

2.5 Data analysis methods

Firstly, literature reviews are summarized as the basis of the study. In conducting the case study, SWOT analysis method is used to study the case websites from various aspects.

After questionnaire data is gathered, statistical analysis method is applied. SPSS will be used as a tool for analyse data. The statistics are widely used including descriptive statistics, bivariate statistics, prediction for numerical outcomes and prediction for identifying groups. MoSCoW analysis is applied to decide what should be designed in the website for the case project.

3 LITERATURE REVIEW

3.1 User-Centred Web Design

User centred design(UCD) is a general term for a philosophy and methods which focus on designing for and involving users in the design of computerized system. (Abras, C., Maloney-K, D., Preece, J. 2004) Authors emphasized the importance of user involvement in the design process of a system. User involvement leads to a better understanding of users' needs for designer. Norman defined user-centred design as "*a philosophy based on the needs and interests of the user, with an emphasis on making products usable and understandable"* (Norman, D. A. 1988). He paid attention on not only the users' requirements, but also the usability of the products. In my point of view, user-centred web design is a philosophy with an emphasis on users in each design process and usability of the web site.

The user-centred web design frameworks are roughly iteration among Discovery, Design and Use. Designers should explore what users need at the very first beginning and then make choices which should be designed in the websites. After completing the design, it's necessary to conduct usability study of the website to see if it meets the objectives of the project.

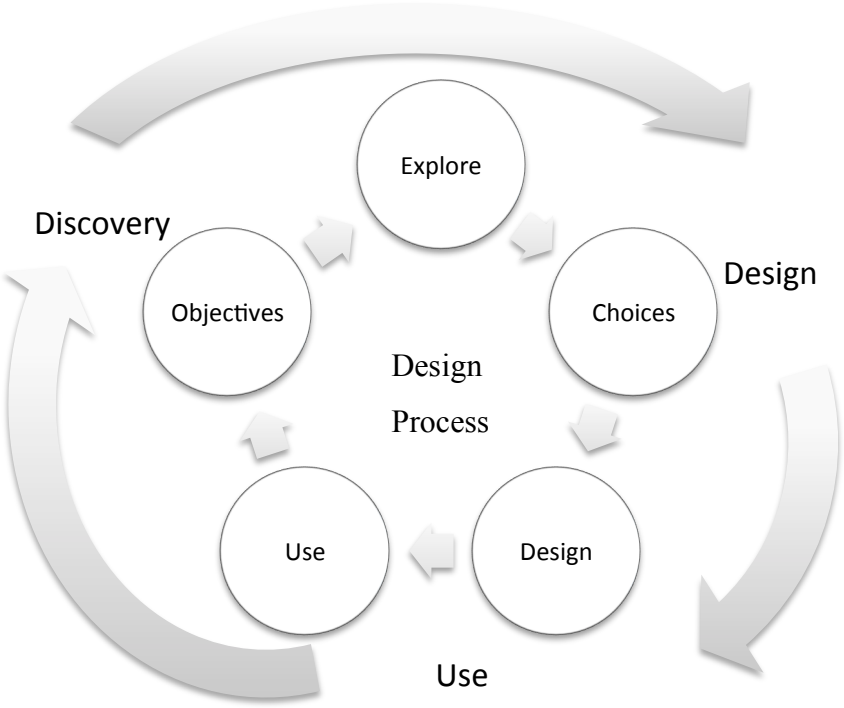


Figure 1: Design Frameworks (John, C. 2001)

During the discovery process, case study is usually conducted to research interactions among role, action and object. Identifying roles, actions and objects is consequential at the beginning of a user-centred design project. Roles are the end users of the system. Actions are the uses of the system. Objects are the information the system provide. Roles perform actions on objects and roles use objects to carry out actions. The users are involved in this process to explore their needs and interests and what information they are likely to see on the website via various methods such as surveys, interviews and observations. Finally, the objectives and scope of the system are clearly defined before stepping into designing the website.

When designing the website, design thinking framework is applied with its four key nucleuses: areas, the action process, the information objects, and interaction design. Areas are blocks or divisions showing different information or in different uses. Then the action process is defined with a question: What are the pages? It can be regarded as the structure of the website. The information objects are things on a web page. How to develop page content to meet users' need should be taken into consideration. Interaction design works with the AUA Model which means a cycle consisting of Awareness, Understanding and Action. John said in his book: *"Everything you do in your relation to the world is an ever-evolving attainment of purpose, based on awareness, understanding and action."*(John, C. 2001). He raised the importance of AUA Model with which designers become aware of what is happening on the screen when looking at the website, understand the every process when carrying out some actions on the website, and take actions to design, modify or improve the website.

The last design framework element is use which focuses on usability study of the system. The usability evaluation or testing is carried out to see whether the website achieves the purposes and meets the users' needs. The International Organization for Standardization (ISO) defines usability as *"the effectiveness, efficiency and satisfaction with which specified, users can achieve specified goals in particular environments"*. (Xristine, F. 2000) Therefore, usability testing aims to improve the usability of the product (or service) by carrying out user experience on prototype or the product and then through observing, recording and analysing users' actions and feelings. It can be applied in every phase covering preliminary

design and development, medium-term improvement and maintenance at late stage.

3.2 Wordpress as a Content Management System

A content management system (CMS) is a computer program that allows publishing, editing and modifying content on a web site as well as maintenance from a central interface. (Andreas, M., Peter T. 2004) Content is the combination of any type of digital information, including text, graphics, web pages, business documents, database forms, video, sound, XML files, etc. Management is a series of processes applied to the content objects, such as collection, storage, approval, collation, positioning, conversion, distribution, search, analysis and so on. Its purpose is to deliver the content to the right place and people, at the accurate time and through the proper methods.

There are many popular open source content management systems such as Wordpress, Drupal, Joomla, etc. Wordpress is a content publishing platform using PHP as a developing language. People can set up his own Wordpress site with the support of PHP and MySQL database on the server. The reason why I choose Wordpress is that there are many well-developed choices among plugins, widgets and themes for me to download and develop base on them.

3.3 Google Maps API

Geoweb is an extension of the existing World Wide Web, linking it to the real world by utilizing this geospatial component of online information. It's a connection between the physical and virtual worlds. (Udell, S. 2009) The idea is that every action and every event happens in a place. Everything is about a place. The geoweb makes people feel the real world from a website or a web page and Google Maps makes the idea of geoweb come true. Google Maps is a product of Google providing web mapping services.

Google Maps API is an application programming interface which contains Google Maps components such as data structures, variables and object classes. Google Maps API makes it free for user to embed Google Maps into an external website.

Google Maps JavaScript API is usually used to add more events, controls, styles, overlays, and layers onto the map interface.

3.4 Mashup Technology

In recent years, an application called Mashup is coming in vogue. *Mashup is an exciting genre of interactive Web applications that draw upon content retrieved from external data sources to create entirely new and innovative services.* (Duane, M. 2006) Generally speaking, a mashup is an application that integrates two or more than two sources into one web page or interface. The idea is that some application programming interfaces are used to aggregate various types of data from different sources in order to provide users with a variety of innovative applications and user experience. GeoImpress is an excellent example of mashup application. It integrates Flickr and Twitter with Google Maps so as to provide users with location-relevant images and blog reviews through a visual method.

With more and more application programming interfaces open-sourced, mashup develops fast. There are many typical mashup applications such as maps mashup, video and image mashup, search and shopping mashup, news mashup, blogs mashup, etc. Google Maps API is quite popular among mashup applications which are location based applications.

4 CASE STUDY

4.1 Case 1: eat.fi

4.1.1 Brief Review

Eat.fi is revolutionizing the way that people dine out. By using the latest in Web 2.0 developments and user-generated content, we offer a totally new, intuitive and comprehensive ways of searching for restaurants, as well as simple-to-use tools to update their information. (Kukumi Oy, 2008)

It's a mashup of Google Maps and User-generated content system. Everyone can register as a user as well as use Facebook, Google or Twitter account to login so that user is able to vote on other's reviews and has his personal review page. User can add restaurants to favourites or bookmark lists. Without an account, user can still rate a restaurant by food quality, overall experience, value and bill.

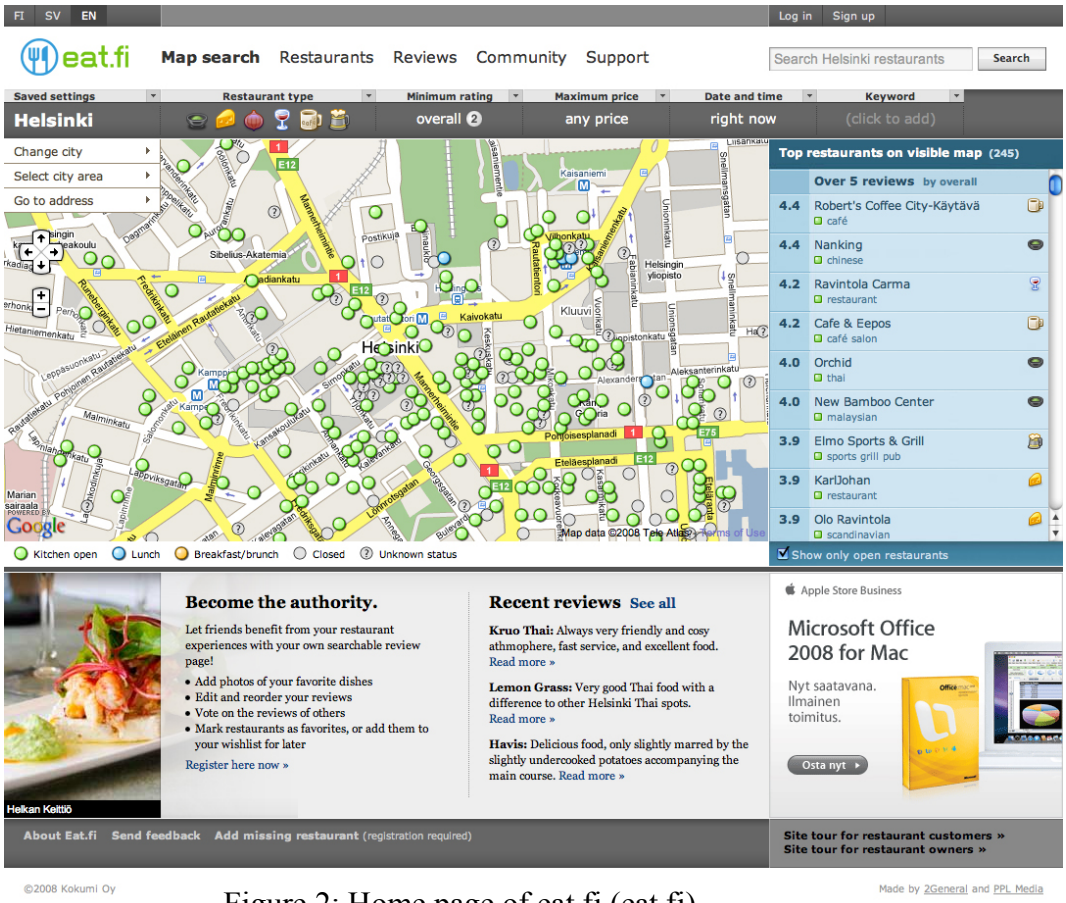


Figure 2: Home page of eat.fi (eat.fi)

When opening the website, a big map with many dots comes into my eyes. It is worth mentioning that the colours of dots are changing according to the time when the restaurants are for breakfast/brunch, for lunch, kitchen open, closed or unknown status. Therefore, it's clear to see the current status of restaurants. The default language is Finnish, but English and Swedish are available as well. Helsinki is a default city displayed on the map. However, users can change city and select city area with navigation bar on the top left corner. Is it also available for a user to centre map on a certain address that he types or his current location. On top of the map, users can filter the restaurants showed on the map by selecting restaurant type, minimum rating, maximum price, date and time, and keyword. On the right sidebar, there is a list of top restaurants. If a user moves his mouse on the restaurant name, the dot which indicates this restaurant on the map is highlighted by a red outline. If a user moves his mouse on the dot, the restaurant name on the right sidebar is highlighted. When a user click on the dot on the map or the restaurant name on the right sidebar, there is a list of top restaurants. If a user moves his mouse on the restaurant name, the dot which indicates this restaurant on the map is highlighted by a red outline. If a user moves his mouse on the dot, the restaurant name on the right sidebar is highlighted. When a user clicks the dot on the map or the restaurant name on the right sidebar, it redirects user to the specific restaurant page which contains general information, photos and reviews of the restaurant.

4.1.2 Site Evaluation - Usability study

In this case, usability study is performed as a method to evaluate the site since this author is interested in the functionalities of the site. Usability evaluation, talked about in the earlier chapter, the usability testing is usually used to test the system's effectiveness, efficiency and satisfaction so as to improve the usability of the system. The usability testing was conducted for the case website: eat.fi to study its effectiveness, efficiency, satisfaction and even shortcomings in order to improve the usability of my project website. The purpose of this usability study is to help the design process of my project.

A total of three participants engage in usability test who are the main developers of the project website including me. The author is responsible for designing the website including designing the interface and functionalities. I am quite young in designing websites. Therefore, it's important to start with evaluating similar websites to develop more ideas based on them.

To begin with, it's critical to know what the tasks there should be during the usability study. Task analysis helps to get a clear understanding of what the system must do and what users can do with the system. Hierarchical task analysis (HTA) method is applied in this study. Peter Hornsby defined hierarchical task analysis as"an underused approach in user experience, but one you can easily apply when either modifying an existing design or creating a new design." (Peter, H. 2010) He also indicates that HTA helps to understand the tasks that users need to perform to achieve certain goals. A task consists of a task goal and it is modelled as a hierarchy of subtasks. In the case, the primary task for a user is to find out a decent restaurant and to be more detailed, to search for a Chinese Restaurant in Espoo. The task model is shown in the figure 2.

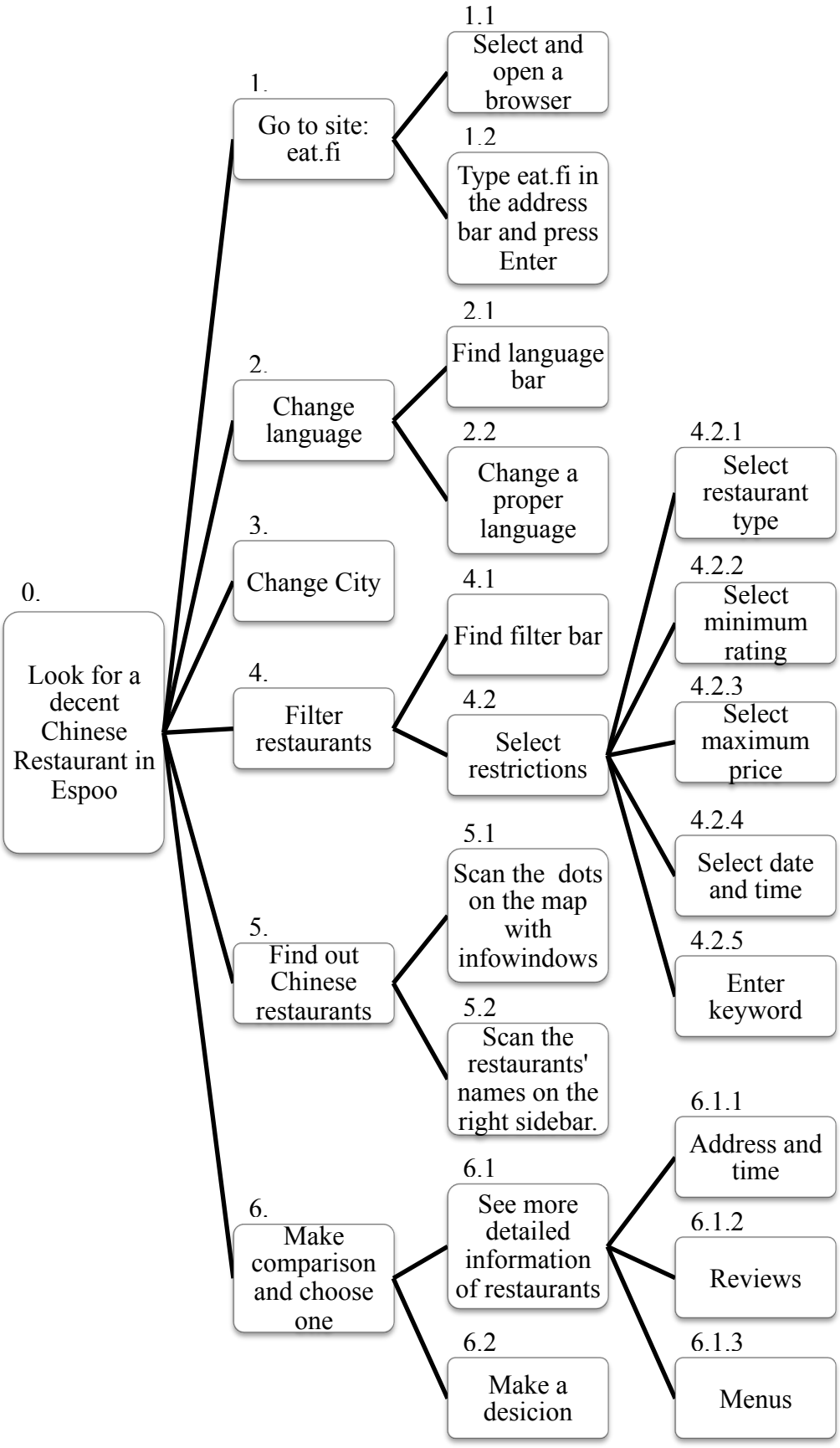


Figure 3: Task model for finding out a decent Chinese restaurant in Espoo

As a user, one follows the task model to conduct looking for a decent Chinese restaurant in Finland. The result is quite disappointing since quite a lot of time is spent on it and one finds one restaurant with few reviews and without menus shown on the website. Firstly, it's quite hard to find language bar since language labels are unremarkable where the background is dark grey and text is in light grey. However, the restaurants filtering bar is quite good and make it convenient for users to find a satisfying restaurant. Then the info window is quite nice but doesn't help a lot. When I find one Chinese restaurant on the right sidebar, and click on it, the page redirects to this restaurant page. A photo gallery of meals and outlook of the restaurant catch my eyes but after 2 seconds feel bored with it. It would be nice to see an animated photo gallery which gives a slideshow automatically. Moreover, all the reviews are in Finnish which makes it inconvenient for foreigners who haven't good command of Finnish to see comments on the restaurant from others. What is more, there is no menu of the restaurant which gives not enough information of the restaurant.

Then a usability evaluation checklist is done based on this task model. All three participants discuss the rating of each factor of the case website. The checklist is broken into 4 sections as Dr. Peter J. Meyers mentioned in his research paper, which are accessibility, identity, navigation and content. (Peter, J. 2012) The accessibility represents how a user is able to access the information on the website. Identity indicates dependable overview of the website. Navigation section includes the information architecture and paths to the content of the website. Finally, the content section is the soul of the website. The content to a website is like food to a human. The checklist is based on the 25-point Website Usability Checklist proposed by Dr. Peter J. Meyers on usereffect.com. All the participants rate on a satisfaction level of 1 – 5 what we think of each of these tasks and features.

Features	**Rating**	**Comments**
Accessibility		
Site load-time is reasonable.	5	The whole website loads within 3 seconds. The map part loads slower

		than other parts while other parts load within 1 second.
Text is easy to read.	5	There is great text-to-background contrast and in main text black-on-white is used which gives quite clear view on text.
The pages look good in different browsers.	5	The website is tested with Firefox 10. +, IE 8+, Google Chrome and Safari and works well.
Images have appropriate ALT tags.	2	The code of website is checked and most restaurants' thumbnails are without alt tags and the logos of restaurants are with alt tags but in numbers.
There is a custom 404 page for broken links.	4	Almost all the links work well except for a link 'Pizza-oline.fi' in the bottom of the site.
Identity		
Company logo is distinct.	4	The logo is placed on the upper left of the screen, but it is too small and a big advertisement flash block on the top and above the logo is more eye-catching than the logo.
The tagline or slogan of the company is clear.	2	There is no tagline or slogan on the website, but the company logo is quite clear to tell others that the website is about 'eat'.
There are clear paths to company	3	The link cannot be found in the

information and contact information.		navigation bar on the top of the screen but the bottom of the page.
Navigation		
Main navigation is easily identifiable.	5	The main navigation bar is on the top of the website and it's clear and easy to identify.
Some helpful and important navigation are clear and easy to be found out.	3	The language navigation bar and login or sign up navigation is not clear since the text and background are not in contrasting colours which are light-grey on dark-grey.
Navigation labels are clear and concise.	5	The navigation labels are easy to read and easily understood.
Company logo is navigated to home page.	4	Logo is navigated to home page, but the map on home page will memory the last actions and will centre on the last visited area.
Links are consistent and easy to identify.	5	The links are highlighted properly and they don't disrupt content of the website.
Content		
The important site content is viewable on a small monitor without scrolling.	4	It depends on the size of the screen. On a big screen it works well while on a small screen a little scrolling is needed.
Major headings are clear and descriptive.	5	The headings are easy to read and skim. They are highlighted with

		distinct colours or bigger fonts.
The design, layout and organization of the site are professional and consistent.	4	All of them are consistent while the design is not so attractive and not related to food. The layout is a little bit out of date since everything is in rectangle blocks with grey borders.
Advertisements and pop-ups are unobtrusive.	2	The advertisements on the website are colourful, animated and attractive, which catch users' eyes. Some advertisements are so big that make main content trivial.

Figure 4: Usability evaluation checklist of case website: eat.fi

4.2 Case 2: yelp.com

4.2.1 Brief Review

Yelp is an online urban city guide that helps people find cool places to eat, shop, drink, relax and play, based on the informed opinions of a vibrant and active community of locals in the know. Yelp is the fun and easy way to find, review and talk about what's great — and not so great — in your world. (Yelp Inc., 2004)

Yelp.com is a location-based mashup which combines Google Maps, local search capabilities, social networking functionality, user review, advertising program, etc. It is obviously an innovative web site with strong functionalities. According to the statistics from the official website of yelp, it was founded in 2004 with over 30 million local reviews so far and had an average of about 78 million monthly unique visitors in Q2 2012. The website lists various businesses of service industry including restaurants, shopping stores, sports, beauty and spas, pets, education, hotels and so on. In this study, the author focuses on the restaurants part.

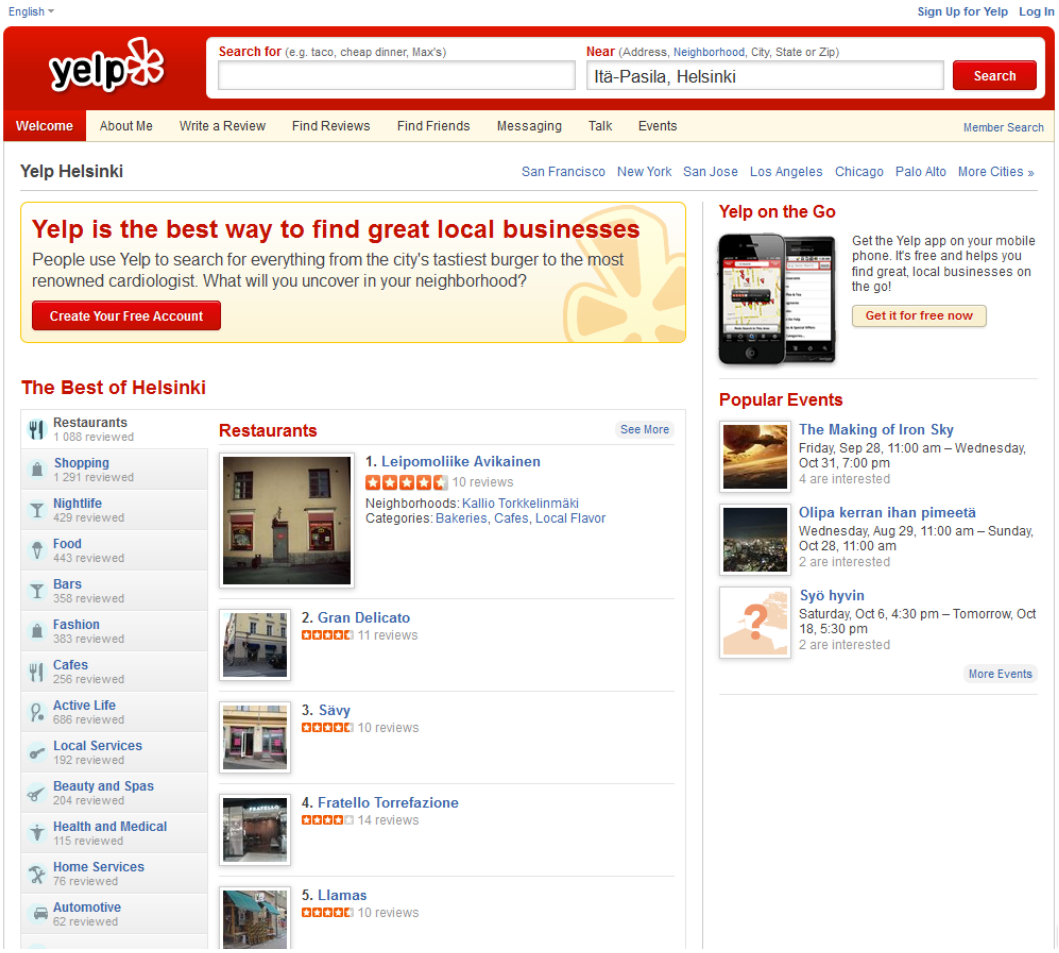


Figure 5: Home page of yelp.com (yelp.com)

When opening yelp.com, it automatically redirects to the Helsinki page. A ranking list of top five restaurants with beautiful photos attracts the eyes. Restaurants are star-rated and number of reviews is displayed next to the stars. If a user wants to view more restaurants, he can click ‘see more’. Then the page redirects to a new page with mosaic view of restaurants which gives users a fresh outlook and of course users can get a list view by clicking ‘List’ on the upper right corner. When scrolling down the page, there is a list of categories of restaurants sorted by first letters. If one clicks Chinese, a list of Chinese restaurants appears and can be explored more by clicking ‘More Chinese’. More Chinese restaurants appear and 10 restaurants in one page with their photos, names, neighbourhoods, addresses, and phone numbers, star rates, review numbers. On the right side of the page, there is a Google map displaying these 10 restaurants’ locations with red triangles. When moving the mouse on a triangle, an information window appears with the specific restaurant information including photo, name, and star rate, number of

reviews, address, phone number, opening hours, and average price. Users can get a more detailed overview of a restaurant by clicking the red triangle on the map or the restaurant's name from the list.

4.2.2 Site Evaluation – SWOT Analysis

SWOT stands for strengths, weaknesses, opportunities and threats. SWOT Analysis is usually used as a strategic planning method or marketing analysis method, while in my study, it is used to study the case website in order to get a better design of my project website. David Avision and Guy Fitzgerald proposed that *SWOT is not specifically a technique related to information systems, but it can be, and has been, used to think through how IT could enhance the strengths and opportunities revealed by the SWOT and help counter the weakness and threats.* (David, A., Guy, F. 2006) Therefore, I can learn the strengths from the case website, avoid the weakness of it, exploit feasible similar opportunity and defend against potential threat in the future.

To begin with, strengths of the site are obvious. When it comes to the appearance and content of the site, the overall structure, layout and content are professional, consistent, appealing and in harmony. Although the layout is quite simple, it still catches visitors' eyes. The colour scheme is basically white and red with little light yellow. Colours affect the human psyche and mind. The site is in warm tone so that it makes visitors feel positive. Besides, the content is relevant to the audience and information is organized in manner that makes sense to the user. The content is relevant to people's life and is tempting to people, especially to females. Moreover, using graphics make the site more intriguing. The photos of restaurants or other stores absorb users' eyes and motivate users to get more detailed information about them. The star rating is critical for visitors as a reference value and gives a direction to select a decent restaurant or store among numerous stores. Furthermore, some designs are innovative and chic, for example, different views of restaurants or stores, mosaic view and list view.

As to the functionality of the site, every component works quickly and correctly. Firstly, the search function runs excellently. When users type in the search box, there is a dropdown list giving hints for potential keywords, which is convenient

and time-saving to users. The results are correct as well. Then all the links and navigations work well and are meaningful. The site uses visual cues properly, such as colour, size and positioning, to show how relatively important links are. The language navigation label is simple but easily identifiable. The labels of categories navigation section are useful and comprehensive. Besides, I pay more attention to the use of Google Maps in the site especially for restaurants which are applied in two ways. One is applied in the restaurant information page. The location of the restaurant is showed on the website with a white star embedded in a red triangle and user can get a bigger view when clicking the icon on the map. It's really amazing that users can search for the driving routes to the destination restaurant which are showed on the map and with detailed texts description on the left side as well. The other one is used to show the adjacent restaurants from a specific category on a map and ten restaurants in one page.

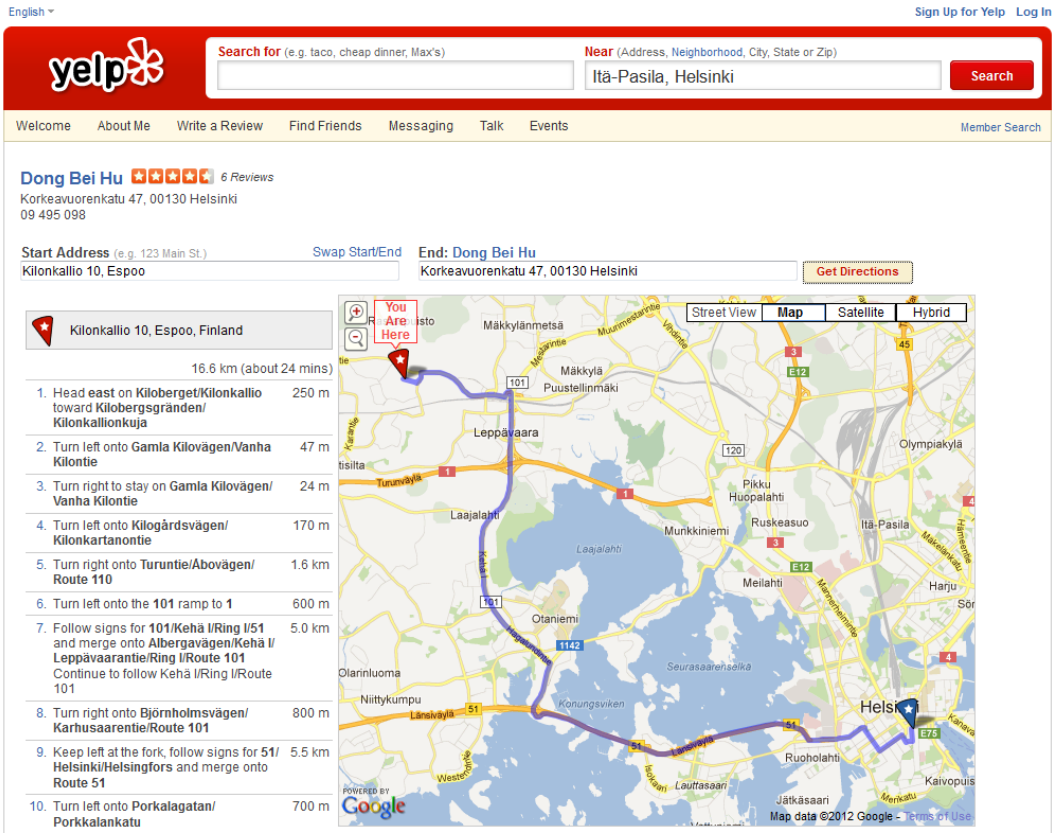


Figure 6: Driving route to the destination restaurant (yelp.com)

Then comes the weaknesses of the site. Firstly, the categories of restaurants are in a mess and hard to find. When we try to find a desirable restaurant, the first thing is to think about which categories it should belong to or we just read the

categories line by line and one by one which costs much time. For example, we want to have Sichuan cuisine and try to find a decent restaurant offering spicy food. At first we look for the word' Sichuan cuisine' in categories but no findings. Then we think of a few keywords related to hotpot which might be found in categories: Asian, Sichuan, and Chinese and spicy. However, we find 'Asian Fusion' and 'Chinese' in the categories and after we consider it for a while I choose 'Chinese'. During this series of actions, it costs much time and effort. Secondly, the list of Chinese restaurants is insufficient. There are only 49 Chinese restaurants in Helsinki on the website but there should be approximately 70 Chinese restaurants in Helsinki. Thirdly, the details of each restaurant are scant and some are supervacaneous. The information about opening hours and parking facility are valuable while the others like 'Good for Groups', 'Takes Reservations', 'Waiter Service', 'Good for lunch or dinner' and so on are otiose. As customers, we would like to see other information about restaurant such as menus, cuisine classification, type (buffet or a la carte), etc. Last but not least, some helpful navigation is quite small and hard to be found out. When we click on 'See More' on the front page and then we want to see more restaurants when we see some best restaurants in Helsinki as Mosaic view, it's really hard for us to see 'More Restaurants'. It costs people many processes and actions to get to the desired page as well.

The opportunities of the site are obvious. The site contains information about not only the restaurants, but also other items related to people's daily life such as shopping, active life, beauty and spas, health and medical and so on, which evidently increases potential customers and site visitors. Besides, there is a site m.yelp.com for mobile devices and there are applications for IPhone, Android, Windows, Blackberry and Palm. With the development of mobile technology, mobile phones become more and more intelligent and play important roles in people's daily life. People always use mobile phone when they are out. Therefore, with these applications and mobile site, users can easily find a decent shopping place or eating place to meet their needs.

However, the threats exist as well. The site covers many areas in people's daily life which may cause the problem that it cannot focus on one part of the areas and may ignore many details or some information. If there are errors or wrong

information on the site, customers and site visitors may lose heart on it. Furthermore, there are more and more similar websites growing up and how to be prominent among them is a strategic objective.

4.3 Observation as a method

Observation is a technique that can be used when data cannot be collected through other means, or those collected through other means are of limited value or are difficult to validate. It can also produce data for verifying or nullifying information provided in face to face encounters. (Beverley, H., Elizabeth, O., Kate, W. 2009) As a qualitative research method, observation makes the research more practical and active. It is needed to find out how end users think about these two websites and how they want the sites to be through observing their performance. Three people are interviewed. At first, there is a short interview to know the interviewees. Then, according to the result of the interview, we set goals for them separately to act with two websites and during that time their actions are recorded down. Finally, their performances with two websites are analysed and conclusions are made.

The first one is a 25-year-old Chinese female student studying in Aalto University and she lives in Espoo. She has never visited eat.fi or yelp.com. She goes to a Chinese restaurant 3-6 times per month and usually goes there for dinner. She has been to 6 Chinese restaurants. She likes spicy food and therefore she would like to go to a restaurant offering Sichuan cuisine. Under this circumstance, she is asked to find a decent restaurant which she has never known and she is really interested in. Firstly, she opens eat.fi. At the moment she sees everything on the front page, her forehead creases in a frown. She says that the page is in a mess and she doesn't like the colour scheme since it's in black and grey. The page is in Finnish and she tries to find the language bar to change the language to English and it takes almost one minute to find it. Then she takes a look at each part of the page. However, the green dots on the map catch her eyes. She moves the mouse on some dots and sees the info windows of different dots. After half minute, she seems to be boring and unsatisfied at the dots and info windows. Therefore, she attempts to find out new functions of the site to help her find a suitable place for

dinner. Suddenly she sees the filtering bar and makes filtering for the restaurants. She sets the restaurant type as Asian food, minimum rating as 4, time to 17:30, and leaves others as default. She moves the mouse on one dot near Kamppi, a big shopping mall in the centre of Helsinki, and she sees the ’Nepalese’ on the info window so that she feels disappointed. She goes to the filtering bar again and sets the keyword as Chinese and updates the map. She only sees three dots on the map. She zooms out the map so that she can see more restaurants on the map. Then the list ’Top restaurants on visible map’ on the right bar interests her. She chooses one restaurant that she is not familiar with, called ’Nanking’. The page changes to the Nanking restaurant page. She takes a look at the page roughly. She tells me that she feels sad about it since there are only a few pictures, not much useful information, no menus available and only Finnish reviews. She cannot determine whether the restaurant offers Sichuan food or not. She goes back to the home page and resets the keyword as ’spicy’ and then ’Sichuan’, but there is no corresponding restaurant found. She changes the keyword back to ’Chinese’ and visits some restaurant pages. Finally, she tells me she would like to go to a Chinese restaurant that she is familiar with. She fails in the task and the problems of the websites come out simultaneously. The total time is 7 minutes 34 seconds.

However, it’s not over yet. She is asked to try with yelp.com. She opens the page and looks around the page for a while. She seems to find something and then she clicks ’See more’ to go to the ’Best Restaurants in Helsinki’ page. Some pictures appear and she moves the mouse on these pictures but nothing occurs. She scrolls down the page gradually and stops at ’Categories’. She reads the words one by one and clicks ’Chinese’. The page changes to ’Best Chinese in Helsinki’ page. She scrolls down and up the page and seems to look for something. After a while, she clicks on ’More Chinese’ and cheers up. The small map on the right side appeals to her. When she moves the mouse on one triangle, one info window appears with one restaurant phone, some basic information including address, neighbourhood, phone number, opening hours and current status. Then she moves the mouse on the restaurant name, and the corresponding triangle turns from red to yellow which also interests her. One minute later, She finds one restaurant called ’Szechuan’ on the lists and goes to the restaurant page to see more information about it. She is upset since there are no photos of dishes, no menus

and even no reviews on this restaurant. However, she sees the external website link of the restaurant on the upper left corner so that she can visit the site to see the menus or more information of the website. After that, she goes back to yelp.com and she tells me that she wants to find other suitable restaurants to compare among them and select the best one. She goes through 5 pages and gives up since she cannot make sure if the restaurants provide spicy food through looking at these pages and she is too tired to go to each restaurant page. Finally, she chooses Szechuan Restaurant. The total time is 4 minutes 3 seconds.

The second interviewee is a 27-year-old Finnish male student in Aalto and he lives in Espoo. He has visited eat.fi but he doesn't know yelp.com. He rarely goes to Chinese restaurants and he likes Cantonese dim sum, especially dumpling and spring roll. Therefore, the task for him is to find a restaurant which he has never been to and offers dumpling or spring roll. He opens eat.fi and set 'Arvosana' (Minimum rating) to 4, 'Aika' (time) to 18:00, and 'Hakusana' (Keyword) to 'Kiinalaista' (Chinese). Then he chooses one restaurant called Happy Garden and goes to that page. He takes a look at the page from general information to reviews. After that, he goes back to the main page and tries another one called Meng Long. After he takes a look at the restaurant page, he tells me that he is very interested in this restaurant after he saw the photos of the dishes and the reviews. Finally, he spends 2 minutes to find out his desired restaurant.

However, it's not enough and he is asked to find another one on yelp.com. Like the former interviewee, he goes to the 'Best Restaurants in Helsinki' page and read the categories one by one. He chooses Dim Sum but there is only one restaurant belonging to this category called China. The China restaurant page is opened and a few reviews in Finnish are viewed. He tells me that the restaurant is the first Chinese restaurant in Helsinki and the dishes there are just so so. Therefore, he goes back to the categories and clicks 'Chinese'. Like the former interviewee, he is quite satisfied with the small map and the interaction between the restaurant names and triangles on the map. He finds one restaurant called Hong Kong on the left lists with quite good rates and goes to the restaurant page. After he takes a look at the reviews, he says that the restaurant offers very good dishes and he would like to go there. Total time is 2 minutes 25 seconds.

The third interviewee is a 26-year-old Russian male worker in Helsinki. He moved to Finland when he was 4 years old. He has heard about eat.fi but hasn't been to this site and he doesn't know about yelp.com at all. He tells me that he likes Chinese cuisine extraordinarily and he sometimes goes to Chinese restaurants to have lunch buffet during week days. He likes the restaurants offering not only traditional Chinese cuisine but also sushi. Therefore, he is asked to find an ideal restaurant to have lunch that he has never been to. Since he goes there on week days and he cannot spend much time on lunch, the restaurant location is a vital factor. Like the first interviewee, when he opens eat.fi, he takes a look at the page and plays with the map. Then he filters the restaurants by setting 'Arvosana' (Minimum rating) to 4, 'Aika' (time) to 12:00, and 'Hakusana' (Keyword) to 'Kiinalaista' (Chinese). He zooms in the map until he can see the centre of Helsinki and there are only three dots on the map then. Therefore, he resets the 'Arvosana' (Minimum rating) to 3. He opens some pages of the restaurants around city centre and closes the pages down. Finally, he finds one restaurant called Happiness and is absorbed in the photos of the dishes. He tells me that the dishes look delicious and the reviews are pretty good. Total time he spent is 3 minutes and 12 seconds.

Then he is asked to find another one through yelp.com. When he sees the categories, he selects Chinese and goes to the page listing all Chinese restaurants. Similarly, he zooms in the map on the right side, and correspondingly, the lists of restaurants are changed as he drags, zooms in or zooms out the map. Then he chooses one restaurant called New Bamboo Centre because its high rate and takes a look at it. He feels quite disappointed at it since there is not much valued information there and no photo of dishes there, and when he goes to the restaurant external website, there is no information about lunch either. After that he is satisfied with one called Tang Dynasty when he sees reviews of it. Next, he clicks 'View Larger Map/Directions' under the small map and he checks the route from his working office to the restaurant. He tells me that it is convenient for him to check the route directly from the website. Finally, he chooses Tang Dynasty because of its fascinating lunch buffet and nearness to his office. Total time is 2 minutes 56 seconds.

After three interviewees are interviewed, the strengths and weaknesses of two websites are obvious. It's more evident to compare among them with a table.

Interviewee	1	2	3
Gender	Female	Male	Male
Age	25	27	26
Nationality	Chinese	Finnish	Russian
Know Finnish or not	No	No	Yes
Frequency to go to Chinese Restaurant	3-6 times per months	Rarely	Sometimes
When	Dinner	Dinner	Lunch
Preference	Spicy food, Sichuan cuisine	Dim Sum, dumpling, spring roll	Lunch buffet, sushi
Has known/ visited eat.fi	No	Has visited it	Heard about it
Succeed with eat.fi	No	Yes	Yes
Time spent on eat.fi	7 minutes 34 seconds	2 minutes	3 minutes 12 seconds
Has known/ visited yelp.com	No	No	No
Succeed with yelp.com	Yes	Yes	Yes

Time spent on yelp.com	4 minutes 3 seconds	2 minutes 25 seconds	2 minutes 56 seconds
Interested in…	Map, info windows on the map, filtering, categories, keywords, menus, photos, comparison	Filtering, information of the restaurant, reviews, photos, category, map	Location, photos, reviews, categories, map, route

Figure 7: Observation table of case website: yelp.com

From the table, I can easily surmise that few people know yelp.com and many local Finnish people or who live in Finland for a long time are quite familiar with eat.fi. But it's not easy to conclude that whether Chinese people go to Chinese restaurants more often than others since many Finnish people go to Chinese restaurants near to their offices to have lunch buffet. Therefore, the attention is not only paid to Chinese users but also Finnish users and other foreigners. There is one interesting phenomenon that the Chinese spent more time than others. Then I realize that according to Chinese psychology, Chinese people like to compare different products or services and thus comparison software for comparing selected restaurants by users may be taken into consideration.

It's a pity that all the reviews on restaurants of two websites are in Finnish while many Chinese people in Finland don't know Finnish. This reminds me of emphasizing the importance of applying different languages in the new website. Besides, how to let users navigate to the right page directly and conveniently is a big task to reduce the time users may spend. Moreover, the functions and elements should be designed based on the users' needs, such as map with its info windows, filtering function, categories, reviews, photos, route-finding function and so on.

However, it is far from enough to get to know users' needs and ideas on new websites just by observing three interviewees. Therefore, more research and investigations are needed. The following chapter concentrates on collecting and analysing data from questionnaires sent to people by email to get more

information about how users think about the two case websites and how they expect for the new website.

5 DATA COLLECTION AND ANALYSIS

5.1 Data Collection and Analysis Methodology

Delbert and Neil proposed that there are five inquiry approaches in qualitative research, which are focus, discipline origin, data collection, data analysis, and narrative form. *Data collection in case study research can be multiple sources, such as documents, archival records, interviews, observations, physical artefacts, and quantitative data. Data analysis in case study can be description, themes and assertions.* (Delbert C. M., Neil J. S. 2002)

A questionnaire was sent to friends in Greater Helsinki area and students in Lahti University of Applied Sciences by email on 4th October 2012 with a short deadline for response on 15th October 2012. The questionnaire is attached (Appendix A).

The information requested concentrated on what users would like to see on the new website of the project by reviewing on the two case websites mentioned in last chapter to elicit their thoughts on new site. This includes customers' attitudes towards importance of information concerning restaurants on the websites, familiarity with the case websites, opinions on two case sites, and requirements on new website. Other information such as users' knowledge on web services is not included.

Data analysis involves scrutinizing and evaluating data to expose the relationships among data and trends towards data. It helps to understand the research work better and get a more accurate assessment. There are two kinds of data, quantitative data and qualitative data which are both covered in the research. *Quantitative data is any data that is in numerical form such as statistics, percentages, etc.* (Given, Lisa M. 2008). This includes the frequency, ratings of satisfaction and ratings of importance. Quantitative data can be displayed and analysed in numbers while qualitative data is not able to be reduced to numbers and are usually collected as descriptions, opinions and explanations. Qualitative data is collected and analysed mostly in observation conducted in last chapter.

The data is analyzed by means of SPSS Statistics which stands for Statistical Package for the Social Sciences originally and later modified to read Statistical Product Service Solutions. The most outstanding feature of SPSS is its friendly operating user interface and nice outputs.

5.2 Results

Responses were received from 32% of all recipients of the questionnaires via email by 15th October 2012. There are 50 responses in total.

5.2.1 Preliminary conclusions

To begin with, tables of frequency distributions are made to observe both categorical and numeric variables, which help to count the occurrences of values within a specific group or interval. In the research, it's vital to get to know the respondents better to increase the reliability and accuracy of the research results. As shown in the frequency tables, there are 22 males and 28 females from the total of 50 responses. Chinese respondents are about 82 percent more than Finnish respondents and respondents from other countries which have 88 percent in total. Respondents' ages vary from 19 to 57 and most of them are single with a highest record of 44 percent. There are 2 missing data in age and may be these two people want to keep secret of their ages and however, it won't impact on the research. There are 16 respondents are in a relationship and 11 are married.

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	22	44,0	44,0	44,0
	Female	28	56,0	56,0	100,0
	Total	50	100,0	100,0	

Nationality

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Chinese	44	88,0	88,0	88,0

	Finnish	3	6,0	6,0	94,0
	Other	3	6,0	6,0	100,0
	Total	50	100,0	100,0	

Relationship

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		1	2,0	2,0	2,0
	Single	22	44,0	44,0	46,0
	In a relationship	16	32,0	32,0	78,0
	Married	11	22,0	22,0	100,0
	Total	50	100,0	100,0	

Statistics

Age

N	Valid	48
	Missing	2
Mean		27,48
Median		25,00
Minimum		19
Maximum		57

Figure 8: Tables of frequency distributions

Then some graphs are displayed to summarize the data in a more visualized way. The pie chart of languages that respondents are familiar with shows that most of the respondents know Chinese and English since most of the respondents are Chinese and still there are 18 percent of respondents only know Chinese and less than 5 percent know both Chinese and Finnish. Therefore, it's very essential to have at least 3 languages which are Chinese, English and Finnish on the new website.

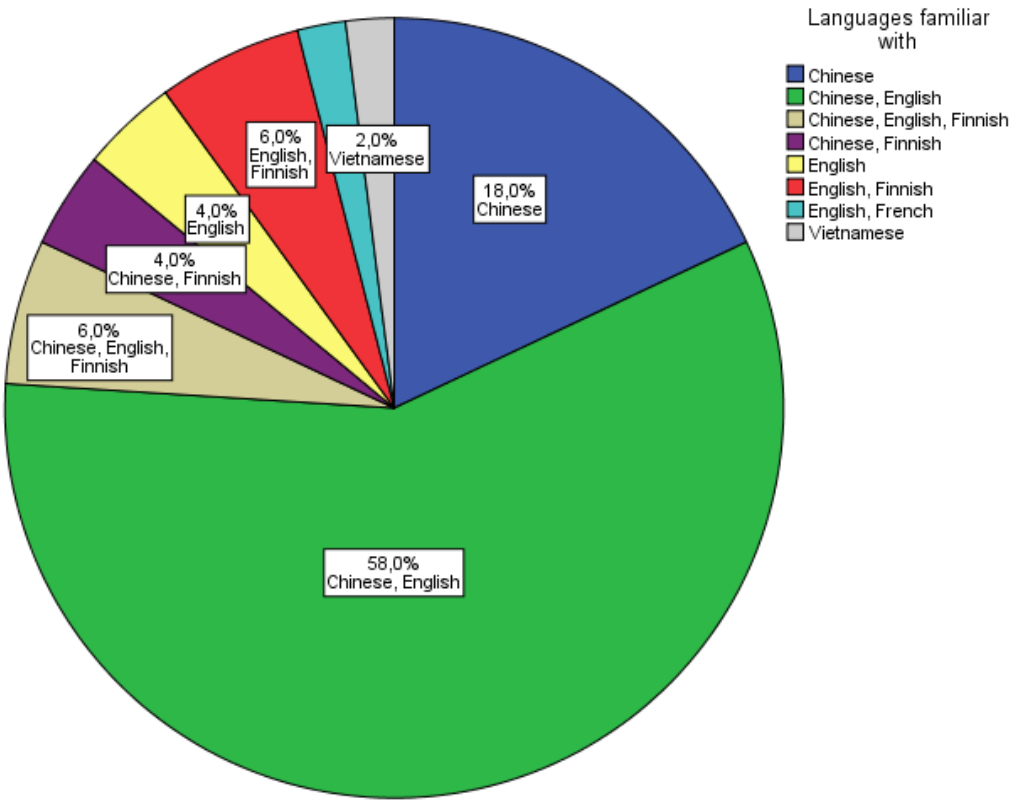


Figure 9: Pie chart of the languages that respondents familiar with

A group of bar graphs helps to illustrate the relationships between respondents and Chinese restaurants and make comparisons between respondents' actions with all restaurants and Chinese restaurants. I can easily conclude that most of respondents go to restaurants 1-4 times per month which has a highest record with 46 percent and go to Chinese restaurants 1-4 times per month as well with the rate of 58 percent. However, there are 8 percent of the respondents who goes to other restaurants but never Chinese restaurants since 2 percent of respondents never go to restaurants and 10 percent of them never go to Chinese restaurants. There are still amount of people go to Chinese restaurants 9-16 times per month which take 8 percent. As most of the respondents are Chinese, I can speculate that Chinese would like to go to Chinese restaurants better than local restaurants or other restaurants. Therefore, unlike eat.fi and yelp.com, our project should pay great attention to Chinese people to let make Chinese people in Finland feel convenient to find a wonderful place for eating. But that doesn't means we will neglect Finnish people or other foreigners and they are important potential users of the new website as well. It is obvious that most people know less than 10 Chinese restaurants while there should be more than 100 Chinese restaurants in Greater

Helsinki area. Respondents who have been to 5-10 Chinese restaurants have the highest record with 44 percent and who have been to less than 5 Chinese restaurants have the second record with 36 percent while only 6 percent have been to 21-30 Chinese restaurants.

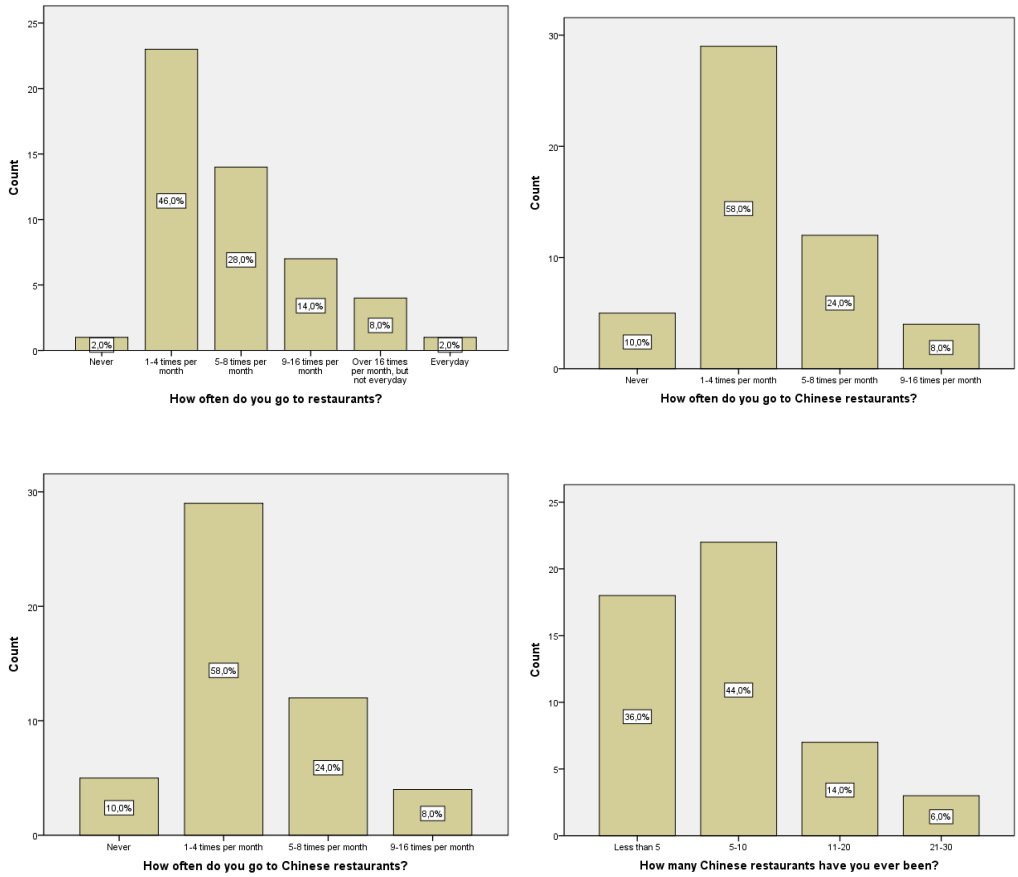


Figure 10: A group of bar graphs of respondents' actions with

Why they know only a few Chinese restaurants is a question that needs research. If people are not interested in the Chinese restaurants, the project is meaningless then, while I think it's impossible and I believe that people like Chinese cuisine but they lack of approaches to know them. Therefore, I make a pie chart to illustrate how they know these Chinese restaurants. Most of them know these Chinese restaurants from their friends and casually or pass by which takes the highest record with 28 percent. Friends are the most way people know the restaurants. However, I find that websites play an unimportant role in it and thus another question rose which is what they think about searching information about restaurants through Internet.

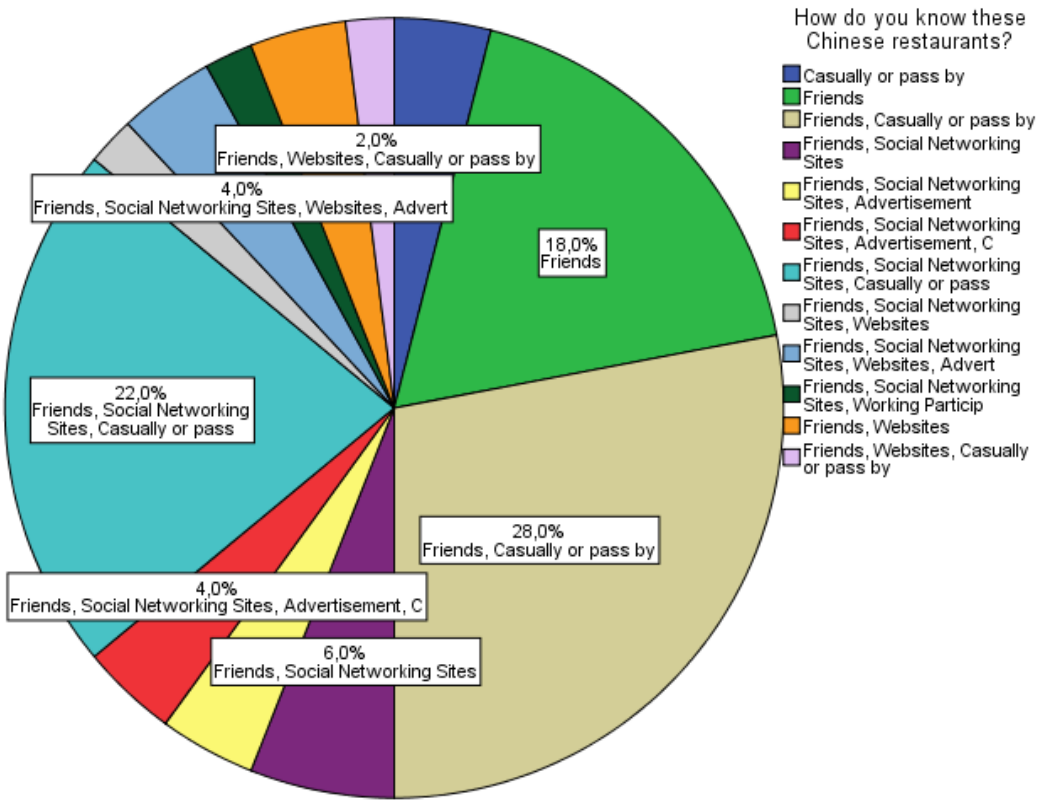


Figure 11: Pie chart of how respondents know these Chinese

Three frequency tables below indicate respondents' thoughts on restaurants' information on Internet. Most of them sometimes search for the restaurants' information through the Internet before out which takes 42 percent, and 28 percent usually do, 12 percent sometimes do while there are still 18 percent never do it. Most of them think it's important and very important to search information before out which both take 32 percentand 20 percent think it's critical to do it while only 3 percent think it's unimportant to do it. From the table showing the importance of seeing menus of the restaurants on a website, I can easily conclude that menus play significant roles in information on a website.

Do you search for the restaurants' information through the Internet before out?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Always	6	12,0	12,0	12,0
	Usually	14	28,0	28,0	40,0
	Sometimes	21	42,0	42,0	82,0
	Never	9	18,0	18,0	100,0
	Total	50	100,0	100,0	

How important do you think to search for the restaurants' information before out?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unimportant	2	4,0	4,0	4,0
	Slightly important	6	12,0	12,0	16,0
	Important	16	32,0	32,0	48,0
	Very important	16	32,0	32,0	80,0
	Critical	10	20,0	20,0	100,0
	Total	50	100,0	100,0	

How important do you think to see menus of the restaurants on a website?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unimportant	1	2,0	2,0	2,0
	Slightly important	4	8,0	8,0	10,0
	Important	9	18,0	18,0	28,0
	Very important	17	34,0	34,0	62,0
	Critical	19	38,0	38,0	100,0
	Total	50	100,0	100,0	

Figure 12: Frequency tables of respondents' thought on restaurants' information on Internet

It seems that most of the Chinese respondents don't know the website eat.fi as shown from the pie chart below which has the highest record with 58 percent. Only 28 percent of them have visited it and 14 percent of them have heard about it, but haven't visited it. Therefore, the popularization of this website among Chinese people in Finland is limited. It's a tough task to make the new website popular among not only Finnish but also Chinese and even other foreigners.

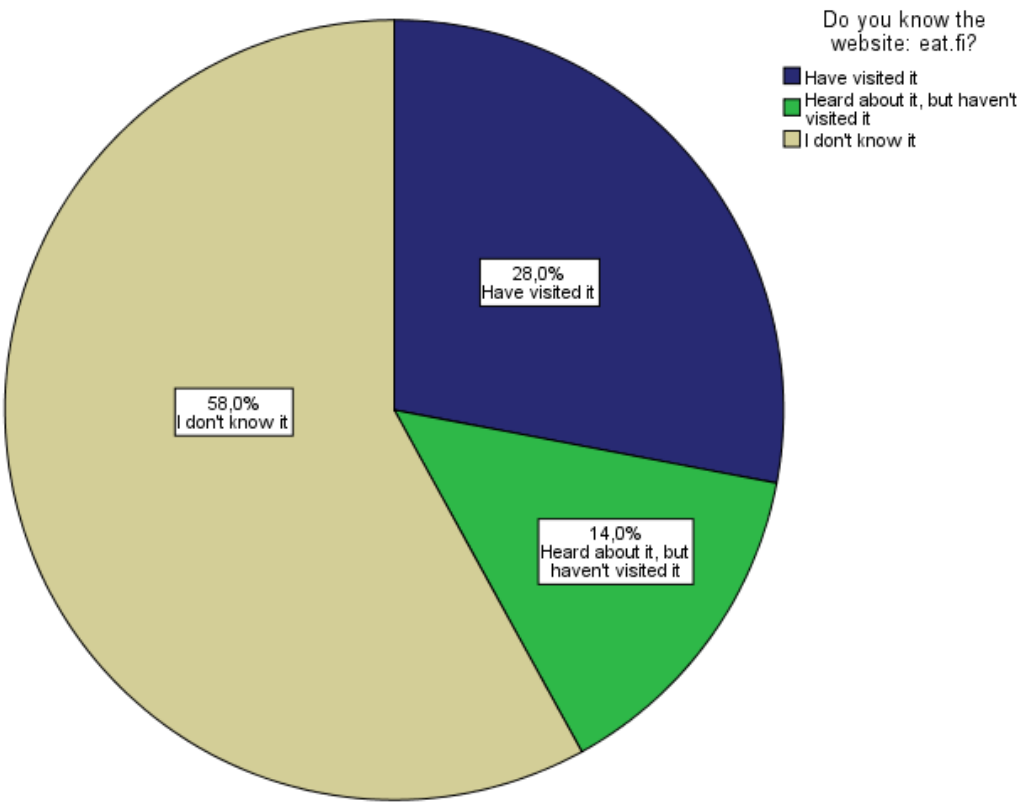


Figure 13: Pie chart of popularity of eat.fi

5.2.2 Observations on respondents' opinions on two case websites

As is shown from the bar chart below, respondents are likely more satisfied with eat.fi than yelp.com, although most of them feel neutral with eat.fi with 26 respondents. More than 15 of them are satisfied with eat.fi while only 8 of them are satisfied with yelp.com. There are 4 respondents more who are unsatisfied with yelp.com than with eat.fi. It seems that eat.fi wins against yelp.fi and why the results are like this is a question I should investigate.

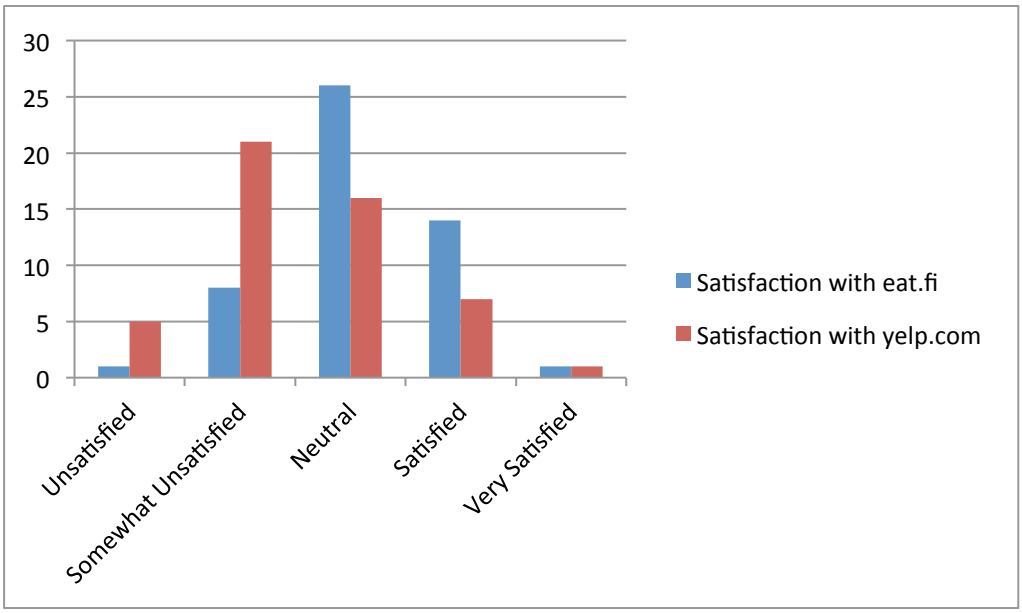


Figure 14: Bar chart of respondents' satisfaction with two case websites

Then we take a look at the open area of some comments and suggestions on these two websites. Since it's not a required field, few respondents commented and suggested on these two case websites. 7 respondents left their comments and suggestions as follows:

- There are too many advertisements on the website which looks in a mess.
- It's too messy.
- The language options for eat.fi are a bit limited. It would be better it English could be added. (I think this respondent didn't find the English menu on the language bar and there should be one option for English.)
- The function is ok, but the interface can be improved. There are too many advertisements, which is a bit annoying and interfering to see the main content.
- No menu for each restaurant.
- UI is too complicated.
- It seems that the website can not satisfy my requirements well.

There are 7 respondents giving their comments on yelp.com as follows:

- Restaurants' information is not enough.

- The front page of this website is much better than eat.fi, and at least the layout is more attractive to the customers. Compared with this one, eat.fi looks a bit messy at the first glance, but very user-friendly later after look into the website.
- The function doesn't serve too well.
- No classification of food based on type, such as Finnish, French, Chinese, etc. (I think this respondent didn't find the categories' ream and there should be the classifications of food based on different types.)
- No maps? (I think this respondent didn't find the maps era and there should be the maps on each restaurant page.)
- It looks like trip advisor. It should be more specialized in food so that it would be the first one to pop up in my mind when I want to find a place to eat.
- It could be better if some special food will be introduced in a specific restaurant for customers on this website.

It's really interesting to see these comments and suggestions. Most respondents were complaining about the user interface of the eat.fi, especially the advertisements on the site, while they were not satisfied with functions and lack of information on the yelp.com. One respondent didn't find the English options on the language bar which means the design of the language navigation bar is illegible and language options play important roles in reading content of the website. Besides, eat.fi seems that money is more important than users since there are lots of advertisements on the site which will annoy users. Therefore, it is essential to make a clear user interface without much advertisement on the new site. Moreover, respondents are more likely to have problems with yelp.com since cannot find the categories and one didn't see the maps of the restaurants. The inconvenience that yelp.com brings to users is obvious. Furthermore, lack of information is a big failure of these two sites including lack of menus and other important and detailed information of restaurants.

However, it seems that eat.fi has made a better achievement than yelp.com. Therefore, I will focus on researching into eat.fi. I would like to figure out why users are quite satisfied with eat.fi.

5.2.3 Independence tests between satisfaction on eat.fi and different factors

To find out the factors that have impact on users' satisfaction on eat.fi, a test is made for independence between them. To begin with, I want to raise a null hypothesis: H_0: The satisfaction with eat.fi is not depending on the satisfaction with the maps on it; H_1: The satisfaction with eat.fi and the satisfaction with the maps on it are related.

The crosstabulation below shows the frequency distribution of satisfaction on eat.fi with respondents' different opinions on its map. Respondents who both feel neutral on the map and the whole site take a highest record.

How satisfied are you with the map on eat.fi? * How satisfied are you with eat.fi? Crosstabulation

Count

		How satisfied are you with eat.fi?					Total
		Unsatisfied	Somewhat unsatisfied	Neutral	Satisfied	Very satisfied	
How satisfied are you with the map on eat.fi?	Somewhat unsatisfied	0	4	3	0	0	7
	Neutral	1	4	14	5	0	24
	Satisfied	0	0	9	7	0	16
	Very satisfied	0	0	0	2	1	3
Total		1	8	26	14	1	50

Figure 15: Crosstabulation table

Then Chi-Square Tests are made to get a clear idea of independence between these two variables. The p-value 0.001< 0.005 in the above output indicates that the risk of error is 0.1%. The null hypothesis is rejected. Based on this study I can conclude that the satisfaction with the maps on the site affect the satisfaction on the whole site. The map plays a very important role on eat.fi. People who are more satisfied with the map will fell more satisfied with the site.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	34,535[a]	12	,001
Likelihood Ratio	27,839	12	,006
Linear-by-Linear Association	16,232	1	,000
N of Valid Cases	50		

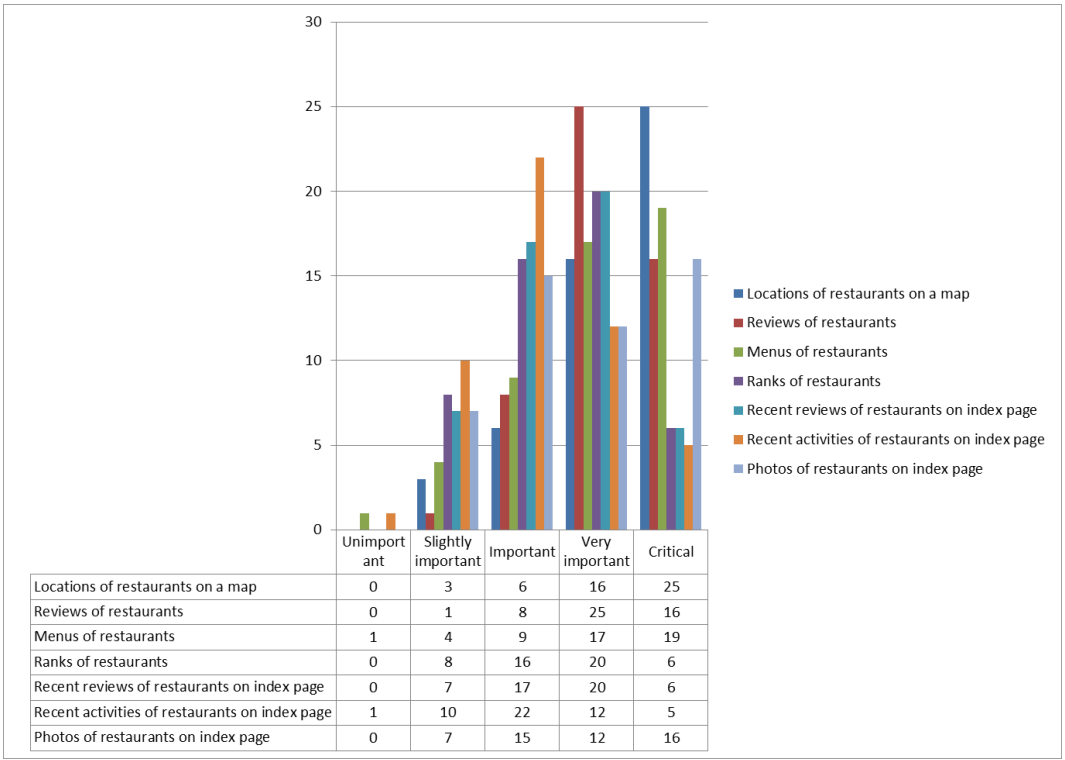
a. 17 cells (85, 0%) have expected count less than 5. The minimum expected count is, 06.

Figure 16: Chi-Square Test table

In the same way, I make crosstabulations and Chi-Square Tests for satisfaction with the filtering bar on the site and opinions on information showed on the site with satisfaction with the whole site. The result is that both the satisfaction with filtering bar and opinions on information showed on the site don't have much impact on respondents' satisfactions with the whole site although most of them are satisfied with the filtering bar and think there is not enough information of restaurants on eat.fi. But it doesn't means that filtering bar and information of restaurants are not important.

5.2.4 Observations on respondents' opinions on different elements on the website

I make a bar chart to compare respondents' opinions on different elements or functions on the website. Most of them think it's critical to see locations of restaurants on a map, menus of restaurants, and photos of restaurants on index page on the website while it's just important or very important to see the reviews of restaurants, ranks of restaurants, recent reviews and activities of restaurants on index page on the website. However, many respondents think it's less important to see the recent reviews and activities of restaurants on index page



	Unimportant	Slightly important	Important	Very important	Critical
Locations of restaurants on a map	0	3	6	16	25
Reviews of restaurants	0	1	8	25	16
Menus of restaurants	1	4	9	17	19
Ranks of restaurants	0	8	16	20	6
Recent reviews of restaurants on index page	0	7	17	20	6
Recent activities of restaurants on index page	1	10	22	12	5
Photos of restaurants on index page	0	7	15	12	16

Figure 17: Bar chart of respondents' opinions on different elements or functions on the website

5.3 Requirements analysis for the new website

Traditionally, requirements are formulated according to a set of notions by the stakeholders. They usually include what the new system should do, how it would be done and how it might look. However, in this project, the stakeholders are my partners and me. Since the project is a user-centred web design, the emphasis is placed on the users rather than the technologist and technology. What users want and how users think about the new website are the key points during the website development process. Therefore, the requirements are made based on users' needs.

Moreover, there are basically two kinds of requirements, functional requirements and non-functional requirements. Functional requirements describe what the system will do while non-functional requirements describe how it will do. In the current stage, as doing basic design for the website, the author focuses on the functional requirements, especially the design for user interface firstly and in this study.

I would like to apply MoSCoW rules to analyse requirements for the user interface of the new website. MoSCoW rules are always used in rapid application development of a project where M stands for 'the Must Haves', S stands for 'the Should Haves', C stands for 'the Could Haves' and W stands for 'the Won't Haves'. According to the research, I can list the basic requirements for user interface design as follows:

- The Must Haves:
    - Map with multiple data – There must be a big map showing restaurants on it with info windowing displaying main information about the restaurants including name, address, phone number, opening hour, photo, etc. On each restaurant page, there must be a map indicating the location of the restaurant.
    - Language bar – The language options must include at least Finnish, English and Chinese.
    - Menus of the restaurants – Menus are presented on the restaurant page.
    - Basic information of restaurants (address, phone number, opening hours…) – There must be basic information of the restaurants on the restaurant page including address, phone number, opening hours and so on.
- The Should Haves:
    - User login function – User can log in to the website using the authorization by LinkedIn, Facebook and so on.
    - Rating – Users can rate the restaurants after they log in.
    - Rank – The rank of restaurants is listed according to the rating given by users.
    - Reviews – Users can review the restaurants after they log in.
    - Categories or tags – It's convenient for users to find a restaurant if the restaurants are categorized or tagged.
    - Additional information of restaurants – Some additional information of restaurants can be shown on the restaurant page such as parking facility, average price, outdoor seating, and take-out service and so on.

    - Filtering bar – The filtering bar helps users find out decent restaurants quickly and easily. The filtering options can be minimum rating, city, city area, categories or tags and so on.
- The Could Haves:
    - Recent activities – The recent activities of restaurants, for example, discount activities, new cuisine, special offers, could be showed on the index page and restaurant page.
    - Route searching function – The driving route, walking route or cycling route could be shown to users from the start place that one user type in to the destination restaurant.
    - Comparison function – Users can select some restaurants to make comparisons among them.
    - Links to restaurants' own websites – Many restaurants have their own websites externally. The URL links to their own sites can be shown on the restaurants page.
- The won't Haves:
    - Large Advertisements – Users always feel annoyed when they see large advertisements on a website. The advertisements on the website are the main income of the website and I cannot ensure that there won't be any advertisements on the new website, but I can ensure that there won't be any large advertisement which will annoy users and affect the design of the website.

After that, the website can be designed for 3 parts primarily, which are the index page, the map page, and the restaurants' pages. On the index page, there will be basically a list of restaurants in descending order of ratings with their basic information and photos, the categories or tags that users can choose to filter the list of restaurants, a language bar and login area. The design draft is the following picture.

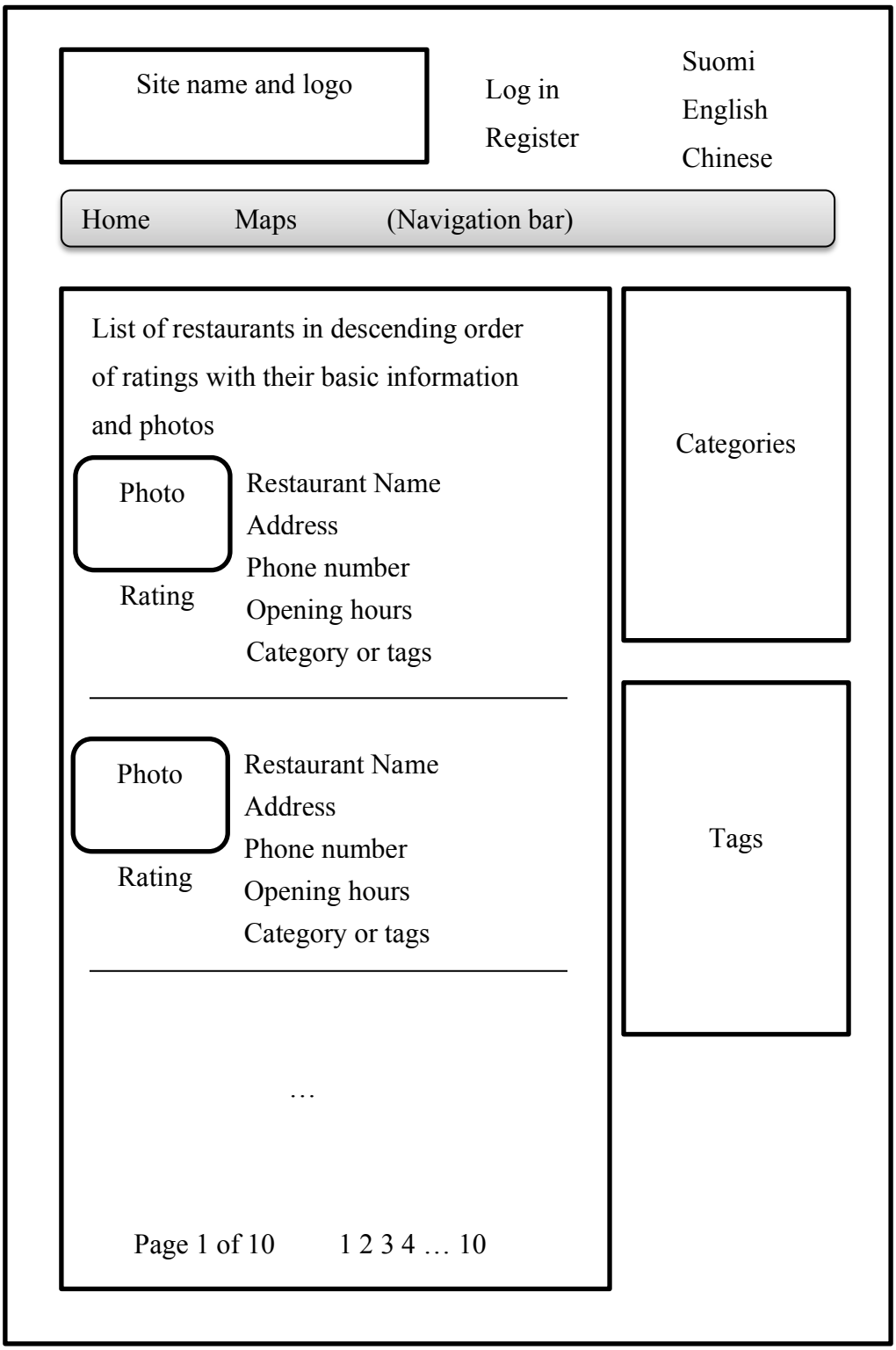


Figure 18: Design draft of the index page

On the map page, there will be a big Google map with the restaurants, a filtering bar, and information windows when users move their mouse on restaurants, and rank list of restaurants on the sidebar.

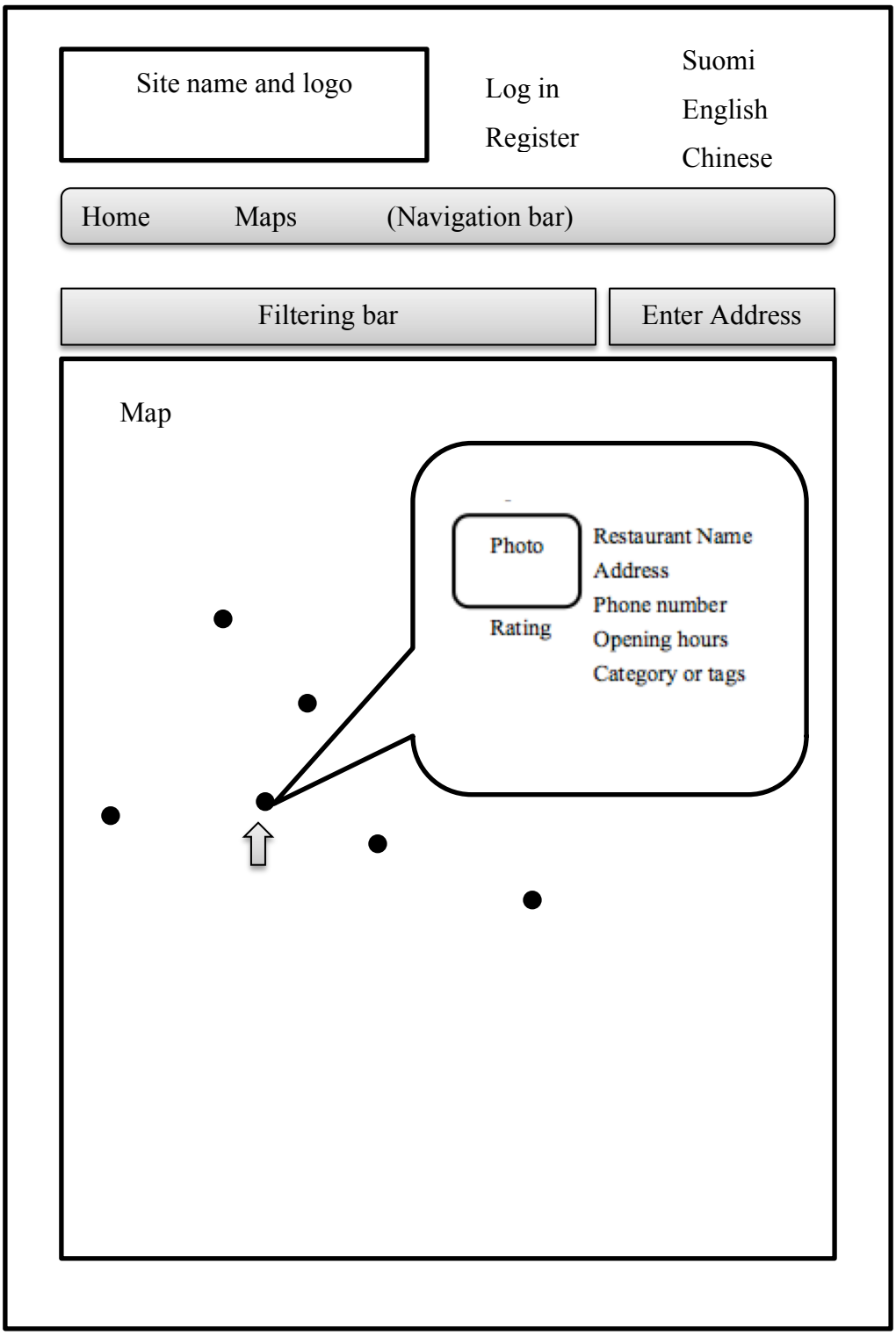


Figure 19: Design draft of the map page

On the restaurant page, there will be a photo gallery, information of the restaurant, reviews, menus and a map of the restaurant.

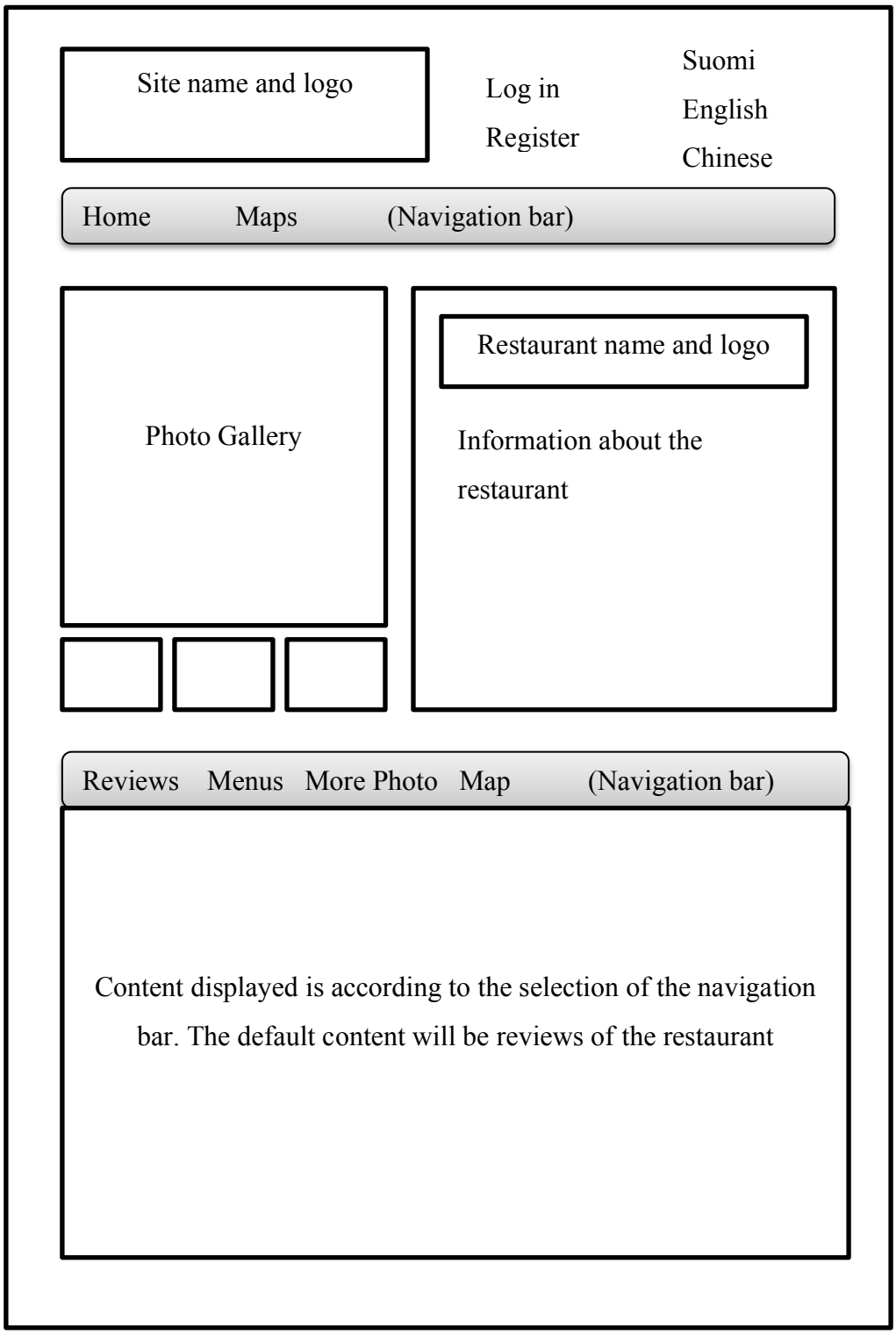


Figure 20: Design draft of the restaurant page

6 CONCLUSION

6.1 Reflection

The user-centred web design is a key concept to the case project for concentrating on users rather than other factors during the development processes of the website. By studying the case websites, eat.fi and yelp.com, one can learn their strengths and avoid the weaknesses to get a general idea of the new website and make it a better one. Then observations on several interviews are conducted to get detailed information and data that cannot be acquired only by questionnaires. Through the observations, many problems were found with the case websites that were not found before and many excellent features as well.

Besides, data collection and analysis methodology is applied to know the users' needs better including what they want to see on the website, which functions are useful to them and what the website looks like. Many graphs, tables and charts help to illustrate the users' notions. It's obvious that maps will play an important role in the new website and many functions should be made to make everything convenient to users. A clear and functional user interface is preferred.

With the use of Wordpress as a content management system, it is easier to arrange and maintain the contents and the functions such as rating, ranking, reviews, and language options and so on. The mashup of Google Maps API with Wordpress will achieve the interactions between the contents and location-based data to meet the users' requirements. The combination of Google Maps API and other tools or functions of the websites is a trend in recent years. It's an innovation in the first place and then evolves as a customer-oriented location-based service.

However, this study helps to make a first basic design for the project website and there are still many things to do with the project such as implementations, testing and publications. Redesign or modifications on design of the project website may occur as well after the first prototype is done and a new study will be conducted to get the suggestions and comments from end users.

6.2 Problems found

During this study, many problems are found. Firstly, there are already some websites concerning restaurants management in Finland such as eat.fi and yelp.com. How we can compete against these existing websites is a tough task. We focus on the Chinese restaurants in Finland while other websites contain Chinese restaurants as well which makes our business harder. Therefore, it's critical for us to make the new website remarkable among these websites.

Besides, collecting data is a hard job. Many people are not willing to spend their time on doing the questionnaires, as they cannot get anything from that. Some methods and rewards can be applied to attract the potential respondents. People usually ignore the questionnaires sent by email or they complete the questionnaires without thinking seriously and therefore, interview would be a better way to collect reliable data.

Furthermore, the design of the project website cannot meet every user's requirements. Every user has his or her own ideas on the new websites. Some people think one function is useful while others may think it otiose. What the author can do is to take care of the most customers' needs according to the research.

6.3 Further Study Field

This study focuses on the primary design of the website, especially the combination of the functions of Wordpress and Google Maps, which is only a small part of the project. Many further study fields are needed as the website develops.

The implementation of the mashup of Wordpress and Google Maps API is an important study field. There are many Wordpress plugins which can be used in the website and there should be plugins concerning Google Maps but the functions may be limited. Therefore, the application of Google Maps API with Wordpress is worth studying.

Moreover, publication and popularization of the project website is another vital study field. When everything concerning the website is ready, how we make it popular among people is a tough task.

However, it is far from enough to complete a wonderful and excellent project now. Many studies will be needed during the development of the project. The main concept will never be changed, which is, users are the key elements in the project.

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APPENDICES

Appendix A: Questionnaire for Restaurants Customers. Originally made in online Google Form: https://docs.google.com/spreadsheet/viewform?formkey=dDlUX005anVzempjdXRUZndaM0Vubnc6MQ#gid=0

Questionnaire for Restaurants Customers

Language: English

* Required

Gender

- Male
- Female

Nationality *

- Chinese
- Finnish
- Other

Language *

Which languages are you familiar with?

- Chinese
- English
- Finnish
- Other:

Age

Relationship

- Single
- In a relationship
- Married
- Divorced
- Widowed

How often do you go to restaurants? *

School restaurants are not included.

- Never

- 1 - 4 times per month
- 5 - 8 times per month
- 9 - 16 times per month
- Over 16 times per month, but not everyday
- Everyday

How often do you go to Chinese restaurants? *

- Never
- 1 - 4 times per month
- 5 - 8 times per month
- 9 - 16 times per month
- Over 16 times per month, but not everyday
- Everyday

How many Chinese restaurants do you know? *

- Less than 5
- 5 - 10
- 11 - 20
- 21 - 30
- More than 30

How many Chinese restaurants have you ever been? *

- Less than 5
- 5 - 10
- 11 - 20
- 21 - 30
- More than 30

How do you know these Chinese restaurants?

- [ ] Friends
- [ ] Social Networking Sites
- [ ] Websites
- [ ] Advertisement
- [ ] Casually or pass by
- [ ] Other:

Do you search for the restaurants' information through the Internet before out? *

Information including restaurant's address, contact information, opening hour, menu, special offer, routes to go there...

- ○ Always
- ○ Usually
- ○ Sometimes
- ○ Never

How important do you think to search for the restaurants' information before out? *

	1	2	3	4	5	
Not important	○	○	○	○	○	Very important

How important do you think to see menus of the restaurants on a website? *

	1	2	3	4	5	
Not important	○	○	○	○	○	Very important

Do you know the website: eat.fi? *

- ○ Have visited it
- ○ Heard about it, but haven't visited it
- ○ I don't know it

The following questions are based on the website: eat.fi

Please visit the website: http://eat.fi/, and answer the following questions

How satisfied are you with this website? *

Does it serve your purpose when you want to go out for eating?

	1	2	3	4	5	
Not satisfied	○	○	○	○	○	Very satisfied

How important do you think to see the locations of restaurants on a map? *

	1	2	3	4	5	
Not important	○	○	○	○	○	Very important

How satisfied are you with the map on the website? *

	1	2	3	4	5	
Not satisfied	○	○	○	○	○	Very satisfied

How satisfied are you with the restrictions for you to select to filter the restaurants on the map? *

e.g. city, restaurant type, minimum rating, maximum price, date and time, keyword

	1	2	3	4	5	
Not satisfied	○	○	○	○	○	Very satisfied

Is there enough restaurants' information showed on the website? *

	1	2	3	4	5	
Too less information	○	○	○	○	○	Enough information

How important do you think to see the reviews of restaurants? *

	1	2	3	4	5	
Not important	○	○	○	○	○	Very important

Which information would you like to see on a map when you move your mouse on a restaurant? *

- ☐ Status (open, closed...)
- ☐ Reviews
- ☐ Picture of the restaurant
- ☐ A small photo gallery of some meals
- ☐ Special offer
- ☐ Other:

Some comments on this website

The following questions are based on the website: http://www.yelp.com/helsinki

Please visit the website: http://www.yelp.com/helsinki, and answer the following questions

How satisfied are you with this website? *

Just the restaurants part of the website. Does it serve your purpose when you want to go out for eating?

	1	2	3	4	5	
Not satisfied	○	○	○	○	○	Very satisfied

How important do you think to see ranks of the restaurants? *

	1	2	3	4	5	
Not important	○	○	○	○	○	Very important

How important do you think to see recent reviews of the restaurants on index page? *

	1	2	3	4	5	
Not important	○	○	○	○	○	Very important

How important do you think to see recent activities of the restaurants on index page? *

	1	2	3	4	5	
Not important	○	○	○	○	○	Very important

How important do you think to see photos of the restaurants on index page? *

	1	2	3	4	5	
Not important	○	○	○	○	○	Very important

Some comments on this website

Thanks a lot!

Submit

Never submit passwords through Google Forms.

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